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Reply to Comment to: 'The System of Rice Intensification: Time for an empirical turn', by D. Glover☆

Norman Uphoff takes issue with my call for 'an empirical turn' in debates about the System of Rice Intensification (SRI) [1]. He argues that the subtitle of my recent paper in NJAS [2] implied that the SRI controversy was mostly a matter of contending opinions rather than observable facts. Instead of opinions, however, my intention was to indicate that the debate about SRI in scientific journals has taken place at a largely theoretical level, specifically concerning theories about biophysical processes and relationships, thus neglecting the lived realities of resource-poor rice farmers. Hence my call for an integrated, empirical, socio-technical approach to the SRI phenomenon.

Framing my argument, I had in mind a set of exchanges between Norman Uphoff, Willem Stoop and Amir Kassam on the one side and John Sheehy, Thomas Sinclair, Kenneth Cassman, Achim Dobermann and other scientists on the other [3–12]. I like to think of these papers as key salvoes in what Shambu Prasad has referred to as the 'Rice Wars' [13]. My point about these articles was that they were dominated by arguments and propositions based on contending theories, including theories based on established scientific understandings or conventional beliefs, about how rice is supposed to grow and how it should be cultivated.

The theory underlying SRI has been elaborated exhaustively by Uphoff, Stoop and Kassam [14–18] and is now quite clearly delineated [19, pp. 36–40]. Critics who attacked these theoretical propositions relied heavily on established theories and conventional models about the growth and cultivation of rice, notably Sheehy et al. [3], Dobermann [5] and Sinclair [7]. From his comment [1] and from other sources, I believe that Uphoff largely agrees with my interpretation of these articles and my analysis of the epistemological orientations reflected therein.

On another level, however, the contention over SRI has centred on disputes concerning methodology, specifically the proper design and execution of scientific experiments and analyses, particularly in the critiques published by Stoop and Kassam [9], Uphoff et al. [11] and Stoop et al. [20]. It was these claims about scientific method and practice that alerted me to the epistemological contestation exemplified by the SRI controversy, which led me to explore that issue in [2].

Uphoff [1] argues that the hostility of some agronomists to SRI might be better explained by competing interests rather than a conflict over knowledge. In a recent research report prepared for the Bill & Melinda Gates Foundation, Ezra Berkhout and I carried out a general review of the current state of knowledge and practice in SRI [19]. In that document we quoted from personal communications received from both Uphoff and Stoop, in which they suggested that criticism of SRI might be motivated by competing interests (p. 111). In his comment, Uphoff has now put his suspicions more explicitly on the record.

Uphoff's allegation reminds me of a similar grievance recounted by Richards [21], in which a proposal for a research programme to select and breed African rices (*O. glaberrima*) was rejected by peer reviewers. The African rices, though low yielding, were hardy and therefore likely to be valuable to small and marginal West African farmers. Richards speculates that the peer reviewers' judgement, that the project was 'old-fashioned and of "no scientific interest"' really meant that the project was 'not GM' (genetically modified) [21, p. 209]. At about the same time, WARDA (Africa Rice Centre) was planning its own research programme to use sophisticated biotechnological breeding methods to combine the hardy characteristics of West African rice types with higher yielding Asian varieties.

More recently, Vanloqueren and Baret [22] have argued that contemporary agricultural research systems are systematically biased towards genetic engineering and against agroecological technologies and systems. Uphoff certainly regards SRI as an agroecological innovation that should not be sidelined by genetic engineering approaches [23]. So is Uphoff correct that a conflict of interests has motivated scientific opposition to SRI? The difficulty with such arguments is that, as Uphoff points out [1], it is very hard to find decisive evidence to prove that such interests are biasing scholarship.

In our report to the Gates Foundation [19], Berkhout and I systematically reviewed the current state of knowledge and practice in SRI. Our assessment was firmly based on our understanding of the underlying science. We found that there is more support in the scientific literature for some of the principles of SRI than for others. However, our report also showed that the practices recommended in SRI were more firmly based on mainstream rice science and rooted in farmers' practices than is sometimes acknowledged by either side in the SRI debate. Overall, we found that a great deal of the available data on the spread and impacts of SRI is unreliable, and we identified numerous gaps and shortcomings in knowledge about SRI.

Unlike the authors criticized in Uphoff's comment [1], however, we proposed that these knowledge gaps should be investigated. We documented sufficient activity, interest and attention to indicate that SRI is a real socio-technical phenomenon that merits serious study. As I have argued elsewhere, the emergence and spread of SRI suggests that farmers, extension organizations, scientists, NGOs and governments are searching for alternatives to conventional 'Green Revolution' methods of agricultural intensification [24].

It strikes me as quite revealing that the article by Sinclair and Cassman [4], which Uphoff strongly criticizes, does not actually contain the phrase 'voodoo science', though it prominently labels

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☆ After the comment of Dr. Norman Uphoff was received, Dr. Thomas Sinclair and Dr. Dominic Glover were invited to write a reply. While Dr. Sinclair declined the offer, Dr. Glover accepted the invitation. Dr. Glover's reply is published above. The Editors consider this debate in NJAS – Wageningen Journal of Life Sciences closed.

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SRI as an 'UFO' or 'unconfirmed field observation'. I have not succeeded in identifying an article by Sinclair or Cassman that uses the former phrase, which leads me to believe that Uphoff must have seen an earlier, more strident draft of Sinclair and Cassman's article. Evidently, it has escaped Uphoff's attention that the offending phrase did not make it into the published version. Uphoff is right to argue that such language is inappropriate in a scientific debate, but it seems that Sinclair and Cassman themselves must have thought better of it and removed the phrase, or agreed to have it removed, before publication.

If my interpretation is correct, the episode sheds additional light on Uphoff's unique status as one of the central protagonists in the SRI controversy, with an intimate personal knowledge of how it has unfolded. The episode also hints at the personal clashes that may have intensified the controversy, thus offering a third explanation alongside the clashes of interests discussed by Uphoff in his comment [1] or the alternative knowledge systems discussed in my paper [2].

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